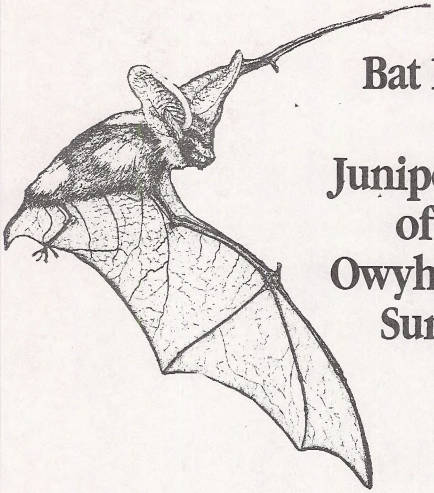

Bat Distribution in the Juniper Woodlands of the Idaho Owyhee Mountains Summer 1996

by
J. Mark Perkins
Joshua R. Peterson

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front illustration by Erica Craig

ABSTRACT

We sampled for bats by mist netting, using broad band sonar detectors and recorders (ANABAT2 detectors and timers from Australia, Radio Shack voice activated recorders)and by structure searches. Our study area was the BLM lands within Owyhee County, concentrating on the water sources on the Owyhee Uplands Byway.

We observed the following species: *Eptesicus fuscus* (big brown bat), *Euderma maculatum* (spotted bat), *Lasionycteris noctivagans* (Silver-haired bat), *Myotis californicus* (California Myotis), *M. ciliolabrum* (western small-footed bat), *M. evotis* (long-eared bat), *M. lucifugus* (little brown bat), *M. thysanodes* (fringed bat), *M. volans* (long-legged bat) and *M. yumanensis* (Yuma Myotis).

Seven (7) of these species are BLM sensitive species. We noted reproductive females or juveniles for the following species: long-eared bat, western small footed bat, fringed bat and the long-legged bat.

Numbers of captures and numbers of recorded calls were low compared to captures in forests to the north. We provide evidence that suggests low populations are due to a lack of adequate day roosts. We concluded that green junipers and most basalt rimrock found within our study area provide marginal roost habitat. We suggest: protection of any and all maternity colonies in the area, creation of snags from larger junipers and inventory of abandoned mines to determine presence of other species or maternity roosts.

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Bats are believed to be an important component of short grass prairie ecosystems as a consumer of nocturnal adult and juvenile forms of insect pests (Bruns 1960, Ross 1967, Constantine 1970, Hill and Smith 1984). Some recognized pests include, but are not limited to: cutworm moths, pine bark beetles, crane flies, biting flies and mosquitoes (Ross 1967, Whitaker et al. 1977, Whitaker et al. 1981a, Whitaker, et al. 1981b, Whitaker 1988), but an objective assessment is not possible at this time because quantitative and qualitative data are lacking (Machmer and Steeger 1995). Idaho has 14 confirmed species, all of which are likely to be study area residents or species that migrate through the area (Table 1). Six of the potential resident bat species were considered federal candidates for listing (*Euderma maculatum, M. evotis, M. thysanodes, M. volans, M. yumanensis, Corynorhinus townsendii),* and are also considered species at risk by the State of Idaho. All 14 Idaho bat species are listed in Table 1, with scientific names, common names and the four-letter designation that are used in tables of this report. At least two bat species *(Lasiurus cinereus, Lasionycteris noctivagans)* are dependent on trees for roosts that have morphological characters primarily found among stands or riparian zones where tree age class exceeds 125 yr. (Perkins and Cross 1988). Many other bat species rely on varying roost structures when such trees are absent (cliffs, caves, mines, buildings) (Perkins, 1984). Distribution of individual bats and bat species is non-random and the overlying forest factor appears to be roost limitation (Perkins 1992, 1995; Perkins and Peterson 1995, Perkins and Anderson 1996).

Little is known of the distribution and species diversity for Southwest Idaho. To address this lack of knowledge, this study was initiated as a cooperative effort by the Boise Bureau of Land Management and the Idaho Department of Fish and Game (non-game program).

OBJECTIVES

1. *Identify the bat species present on the Juniper Forest habitat of the resource area;*
2. *Identify structures that are used or could be used as maternity, day roosts, or night roosts;*
3. *Provide management options for structures used and other landforms.*

Table 1. Scientific and common names and four letter designations for Idaho bat species.

SCIENTIFIC NAME	COMMON NAME	4-LETTER CODE
Antrozous pallidus	Pallid Bat	ANPA
Eptesicus fuscus	Big Brown Bat	EPFU
Euderma maculatum	Spotted Bat	EUMA
Lasionycteris noctivagans	Silver-haired Bat	LANO
Lasiurus cinereus	Hoary Bat	LACI
Myotis californicus	California Myotis	MYCA
M. ciliolabrum	Western Small-footed Myotis	MYCI
M. evotis	Long-eared Myotis	MYEV
M. lucifugus	Little Brown Bat	MYLU
M. thysanodes	Fringed Myotis	MYTH
M. volans	Long-legged Myotis	MYVO
M. yumanensis	Yuma Myotis	MYYU
Pipistrellus hesperus	Western Pipistrelle	PIHE
Corynorhinus townsendii	Townsend's Big-eared Bat	PLTO

MATERIALS AND METHODS

Study Area.

The study area is considered part of the Great Basin short-grass prairie and consists of a series of mountain uplifts and valleys occasionally drained by perennial streams, some of which have eroded deep canyons (figure 1). Prior to fire suppression, junipers (*Juniperus occidentalis*) were limited to rocky outcrops where they were more protected from periodic fires which swept through the grasslands. With fire suppression, large tracts of previously shrub-steppe vegetative habitat has been replaced by juniper forests. Water developments in the form of large (>0.5 ha) and small reservoirs provide year round sources of drinking water and insect biomass for foraging bats. Some riparian zones are heavily impacted by grazing, and are lacking all growth stages of the larger woody plants (cottonwood-*tricocarpa,* willow-*salix sp.)* which can provide roost sites for bats. Other drainage's contain relatively intact riparian zones. In addition, a few drainage's contain cliff faces for bat roost sites. In the interior of the study area, extensive mining has occurred and numerous abandoned mine tunnels and shafts also provide day and night roost sites. Most buildings from present and prior human habitation outside the mining zone are occupied or used on a regular basis.

Methods.

We sampled for bats using four techniques: mist nets, ANABAT2's (broad band sonar detectors), Tuttle-harp traps at night roosts, and structure searches. By using all four survey techniques, we believe it allowed us the best probability of detecting all species present. We kept standard data (species, date, time, site, age, sex, time of capture, reproductive condition, health).Sample sites are arbitrary, but we attempted to include all habitat types within the Owyhee upland area. Sites were selected jointly by BLM and ourselves.

For statistics we use STATMOST a computer statistical package (DATAMOST, Salt Lake City, UT).

MIST NETS: We selected suitable ponds and creek pools for netting. We focused our sampling when weather was optimal (July). Mist nets allowed us to sample for the bats that roost in inaccessible sites and do not night roost in structures or in areas that can be surveyed expediently.
ANABAT2: We simultaneously sampled large ponds that were not readily sampled by mist net with ANABAT2 machines, timers and recorders. Each site was sampled for at least the first 1.5 hr. post sunset, some were sampled all night. Tapes were analyzed using a 486 computer and a Zero crossing meter with ANABAT2 5.1 software.

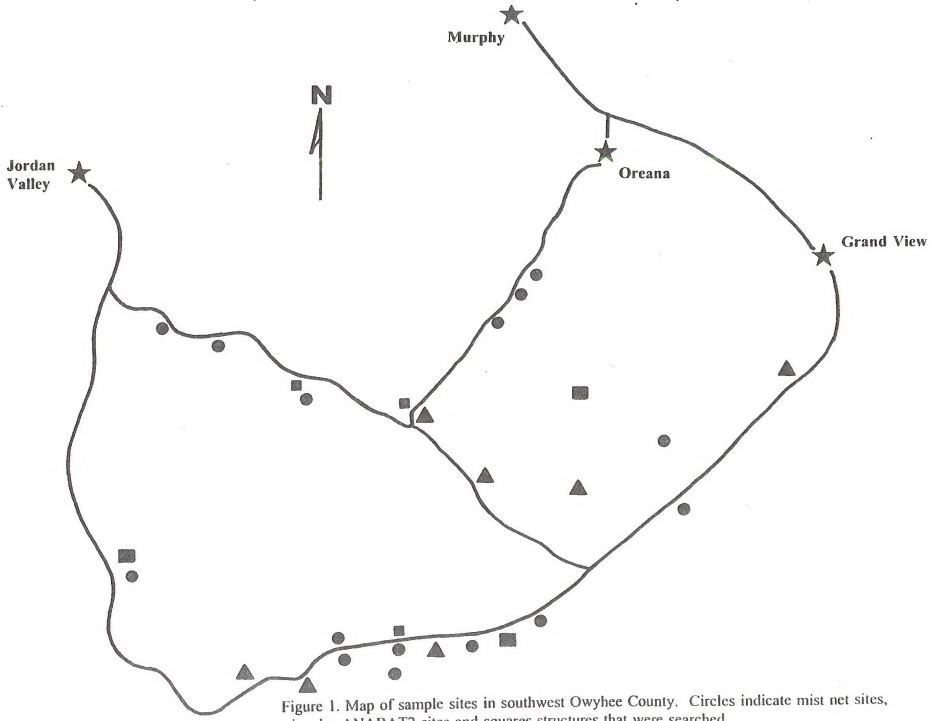


Figure 1. Map of sample sites in southwest Owyhee County. Circles indicate mist net sites, triangles ANABAT2 sites and squares structures that were searched.

STRUCTURE SEARCHES: Bridges, barns and abandoned buildings were searched for night roost use. Buildings, caves and mines were searched for hibernating bats, day and night roost use. We sampled 100 juniper snags from a recent fire to determine if any provide potential day roost sites. Species present will be counted and data gathered as under MIST NETS.

RESULTS

MIST NETS. We netted a total of sites 15, capturing 28 bats comprising 7 species (Table 2). All bats were captured at four sites. Six (6) sites yielded no bat captures. Capture results indicate that five (5) of the captured species, (*Myotis ciliolabrum, M. evotis, M. evotis, M. volans* and *M. thysanodes)* have reproductive females within the sampled areas. Mist net sampling is dependent upon water. All mist net and ANABAT2 sites sampled had junipers, but only two sites had stands with any snags (Nickel Creek and Deep Creek). Juniper stands around the other sampled sites consisted exclusively of "dog-hair" junipers whose dbh did not exceed 25 cm.

ANABAT2 RESULTS. We sampled seven (7) sites. At one site the delay timer malfunctioned and no recordings were made. At two sites no bats were noted. At four sites we recorded approximately 1,000 individual bat calls. Range of numbers of calls varied from 31-565. From this group of calls, approximately 50 were assignable to species (Table 3). Calls indicated the probable presence of two species we did not net-*Eptesicus fuscus* and *Euderma maculatum*. Results appear to parallel those of mist netting, in that occurrence of bats within the study area is highly localized.

STRUCTURE SEARCHES. We searched 10 buildings, 2 mines, and 3 bridges. We noted only one bat (*M. evotis)* under a bridge over the Owyhee River at North Fork Campground (Table 4). In the 100 juniper snags sampled, we noted only nine woodpecker holes and few cracks that would provide roosts for most bats. Most snags (80/100) were less than 25 cm dbh.

DATA ANALYSIS. We were not able to complete any meaningful data analysis as results were too variable and numbers for each species too low to derive any real habitat affinities.

Table 2. Results of mist netting, Owyhee County, Idaho, summer, 1996.

SITE & LOCATION	DATE	SPECIES	#M	#F	#?	TOTALS
CHARITY SPR. T6S,R2W,S14	7/16/96	NO BATS CAPTURED				
CASTLE CREEK T6S,R2W,S15	7/16/96	NO BATS CAPTURED				
GILMORE CREEK T6S,R2W,S22	7/16/96	NO BATS CAPTURED				
T9S,R2W,S35	7/26/96	MYEV	0	1	0	1
		MYTH	0	1	0	1
MUD FLAT	7/26/96	MYEV	1	1	0	2
T9S,R2W,S25		MYTH	0	1	0	1
T9S,R6W,S36	7/27/96	MYYU	0	0	1	1
NORTH FORK CANYON T9S,R5W,S31	7/27/96	NO BATS OBSERVED OPTICALLY OR AURALLY (LISTENING POST FOR SPOTTED BATS)				
DEEP CREEK	7/28/96	LANO	2	0	0	2
T10S,R3W,S03		MYEV	2	1	0	3
		MYVO	0	2	0	2
BATTLE CREEK WELL T8S,R1W,S25	7/31/96	NO BATS CAPTURED				
T8S,R1W,S27	7/31/96	MYEV	3	2	0	5
		MYLU	1	0	0	1
		MYVO	0	2	0	2
NICKEL CREEK,	8/1/96	MYCI	0	1	0	1
T10S,R4W,S23		MYEV	0	4	0	4
		MYVO	0	1	0	1
FLINT CREEK T6S,R4W,S22	8/2/96	NO BATS CAPTURED				
T6S,R4W,S36	8/2/96	NO BATS CAPTURED				
T5S,R5W,S07	8/3/96	NO BATS CAPTURED				
T6S,R5W,S29	8/3/96	NO BATS CAPTURED				

Table 3. Results of ANABAT2 recordings, Owyhee County, Idaho, summer 1996.

SITE AND LOCATION	DATE	NUMBER OF CALLS	SPECIES
BENNETT RESERVOIR, T10S,R2W,S05	7/31/96	145	EPFU MYCA MYCI MYEV
3 MI EAST BENNETT RESERVOIR T10S,R3W,S01, NE CORNER	8/01/96	31	EPFU LANO MYCI MYYU
STONEMAN CREEK T10S,R3W,S06	8/01/96	NO CALLS RECORDED	
PEPPERMINT SPRING T10S,R5W,S17	7/27/96	RECORDER MALFUNCTIONED EUMA HEARD WHILE COLLECTING RECORDER.	
POISON CREEK CAMPGROUND	7/28/96	NO CALLS RECORDED	
BATTLE CREEK HILL RESERVOIR T9S,R1W,S09	7/31/96	595	EPFU MYCI MYEV MYVO
SPENCER RESERVOIR T7S,R3W,S13	8/03/96	400	EPFU LANO MYCA MYCI MYYU

Table 4. Results of structure searches, Owyhee County, Idaho, summer, 1996.

STRUCTURE AND LOCATION	DATE	SPECIES	SIGNS
MUD FLAT WORK CENTER T9S,R2W,S35	7/27/96	NO BATS	GUANO IN OPEN GARAGE
BRIDGE OVER NORTH FORK T9S,R6W,S36	7/27/96	MYYU	GUANO
BRIDGE OVER DEEP CREEK T9S,R3W,S3	7/28/96	NO BATS	
7 BUILDINGS, T7S,R1W,S8/9	7/27/96	NO BATS	GUANO
2 MINES, T7S,R1W,S09	7/27-28/96	NO BATS	MOTH WINGS GUANO
BRIDGE AT SPENCER RESERVOIR	8/02/96	NO BATS	
BRIDGE T6S,R3W,S32	8/03/96	NO BATS	

DISCUSSION

Low numbers of individual bat captures during mist netting and structure searches and the relatively low bat activity detected by the ANABAT2 recorders suggests that bat population in the Juniper forests of the Owyhee uplands are not numerous and species diversity is low. Results are comparable to those we noted in a study of BLM and private timber lands in western Oregon. In both cases, bat captures were relatively low compared to old growth forests, and ANABAT2 results highly variable with the maximum numbers of calls recorded approximately one-third (1/3) of the maximums noted in old growth forests (Perkins and Peterson 1996).

Perkins (1993), Perkins and Anderson (1996), Kunz (1973) and Humphrey (1976) have presented evidence that suggests bat distribution and local populations are highly dependent on available roosts. In this study and in the western Oregon BLM study, we suggest that the results correlate closely with the above four papers: a low number of bat captures is directly related to a lack of usable day roosts.

Bats readily use structures such as buildings, mines, caves, snags and stumps for day roosts. Characteristics of day roosts (maternity colonies and single males) for each type of these structures is fairly rigorous. In the case of buildings, bats prefer dark or twilight areas that are consistently warmer than diurnal and nocturnal ambient temperatures. In most cases, bats inhabit attics of houses or the high reaches of barns where warmer temperatures are maximized (Barbour and Davis 1969). Mines and caves are used if temperatures are at or above 20 deg. C; these temperatures may be established by airflow or by the clustering of the bats (Tuttle and Stevenson 1978). Snags used as day roosts are generally large (>25 cm dbh), stand above the dominant canopy, and have exfoliating bark, woodpecker holes or cracks from lightening strikes or heart rot.

Our survey of structures (buildings and mines-no caves were noted) and juniper snags did not reveal many potential roosts. The BLM survey in western Oregon was similar in that we found only one mine, no caves and snags >25 cm dbh were less that 1/hectare. In addition, *M. evotis* and *M. volans* were captured at the western Oregon BLM study area more often than any other species. We also noted seven (7) species during that study.

Perkins (1996) presented evidence that suggest when roosts are in short supply, species diversity declines and the end result is that larger, more aggressive bat species exclude the smaller and more passive species, or the medium size bat species such as *M. evotis,* which are able to exploit a variety of roosts, remain.

If the North Fork site is representative of cliff faces in the Owyhee uplands, our results and those of L. Lewis (*pers. com.)* suggest these basalt cliffs do not provide large amounts of roost habitat. We observed only three bats flying at the two sample sites, and captured only two bats during a four hour sample period.

Our data suggest that there is a paucity of bats and bat species for this area, primarily due to a lack of quality day roosts. Lack of day roosts can be attributed to the type of ecosystem, degradation of the cottonwood riparian zone and its' associated snags, and lastly fire suppression which has likely resulted in a decline in larger juniper snags.

RECOMMENDATIONS

We would recommend the following management actions or prescriptions for the Owyhee country:

1. All snags greater than 25 cm dbh be preserved. These snags will provide roosts not only for bats, but other primary and secondary cavity nesters.

2. Where riparian zones have been stripped of large cottonwood trees and snags, we suggest riparian restoration. For the interim, creating snags from larger nearby junipers may provide an interim source for cavity nesters until the cottonwoods have an opportunity to mature and provide snags for roosts.

3. We suggest a radio tracking project to identify day roosts used by the bat species present, particularly at our more successful net sites. Data from radio tracking will provide day roost parameters which will assist in selection of junipers for prescription recommended in #2 above.

4. Our data from this study area and that of Perkins and Anderson (1996), Perkins and Peterson (1996) and Humphrey (197) also suggest that any day roost sites which support maternity colonies should be protected.

5. A thorough inventory (at least two visits) of mines, associated buildings and bridges should be completed for this resource area. This will provide a data base for future monitoring and management direction.

REFERENCES

Barbour, R. W. and W. H. Davis. 1969. Bats of America. Univ. Press Kentucky, Lexington. 286 pp.

Bruns, H. 1960. The economic importance of birds in forests. Bird Stud. 7:193-208.

Constantine, D. G. 1970. Bats in relation to the health, welfare and economy of man. *In* Biology of Bats. Vol. II. W. A. Wimsatt (ed.). Academic Press, NY, NY pp. 320-420.

Hill, J. E. and J. D. Smith. 1984. Bats: a natural history. Univ. Texas Press, Austin, Tex. 243 p.

Humphrey, S. R. 1975. Nursery roosts and community diversity in neartic bats. J. Mammal. 56: 321-346.

Kunz, T. H. 1973. Resource utilization: Temporal and spatial components of bat activity in central Iowa. J. Mammal. 54:14-32.

Mechmer, M. M. and C. Steeger. 1995. The ecological roles of wildlife tree users in forest ecosystems. Research branch, B. C. Ministry of Forests. 54 pp.

Perkins, J. M. 1992. Are bats normal? Paper presented to the 27th north American symposium on bat research, Gainseville, FLA.

Perkins, J. M. 1994. Results of Summer bat Surveys, Wallowa Valley Ranger District, Eagle Cap Ranger District, and the HCNRA of the Wallowa-Whitman National Forest, Wallowa County, Oregon, Summer, 1994. Unpub. Rept. to the USFS. 85 pp.

Perkins, J. M. 1996. Does competition for roosts influence bat distribution in a managed forest. *in* Bats and Forests Symposium, Barclay, R. M. R. and R. M. Brigham Eds. October 19-21, 1995. Victoria, B. C. Canada. Work. Paper 23/199.

Perkins, J. M. and R. G. Anderson. 1996. Relationship of snags to bat abundance in a managed forest. Paper presented to the 26th North American Symposium on bat research, Bloomington, IN.

Perkins, J. M. and J. R. Peterson. 1995. Analysis of female bat distribution in a managed forest. Paper presented to the 2nd annual North American Wildlife Conference, Portland, OR.

Perkins, J. M. and S. P. Cross. 1988. Differential use of some coniferous forest habitats by hoary and silver-haired bats in Oregon. Murrelet 69:21-24.

Ross, A. 1967. Ecological aspects of the food habits of insectivorous bats. West. Found. Vert. Zool. 1:204-249.

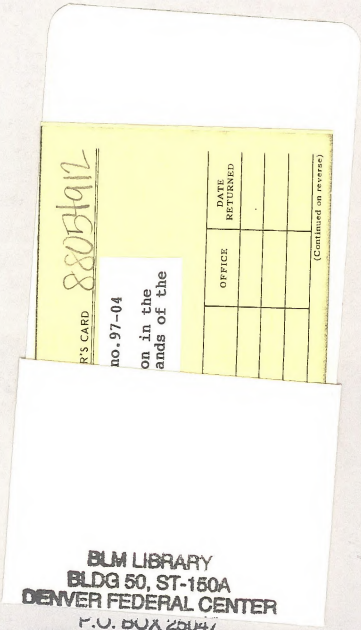
Tuttle, M. and D. Stevenson. 1978. Variation in the cave environment and its biological implications. p108-121. *in* Proc. of the Natl. Cave Management Symp. (R. Zuber, J. Chester, S. Gilbert and D. Rhodes, eds.). Adobe Press, Alburquerque. 140 pp.

Whitaker, J. O., Jr. 1988. Food habits analysis of insectivorous bats. *In* Ecological and behavioral methods for the study of bats. T. H. Kunz (ed.). Smithsonian Inst. Press, Washington, D. C. pp. 171-189.

Whitaker, J. O. Jr., C. Maser, and S. P. Cross. 1981a. Food habits of eastern Oregon bats, based on stomach and scat analyses. Northwest Sci. 55:281-292.

Whitaker, J. O. Jr., C. Maser, and S. P. Cross. 1981b. Foods of Oregon Silver-haired bats, *Lasionycteris noctivagans*. Northwest Sci. 55:75-77.

Whitaker, J. O. Jr., C. Maser, and L. E. Keller. 1977. Food habits of bats of western Oregon. Northwest Sci. 51:46-55.



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